

Application No.: 10/528,721
Amendment and Response dated June 12, 2009
Reply to Office Action of December 12, 2008
Docket No.: 1508-3 PCT/US
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REMARKS

STATUS OF CLAIMS

Please cancel Claims 1-9, 13, 15 and 16. Please amend Claims 10 and 20. Lastly, please enter new Claim 21. After entry of this amendment, Claims 10-12, 14 and 17-21 will be pending. Support for these claim amendments can be found throughout the specification and in the claims as originally filed. No new matter has been added.

CLAIM FEES

It is noted that the application was originally filed with 20 claims. Due to the cancellation of independent Claim 1 as well as dependent Claims 2-9, 13, 15 and 16 plus the addition of Claim 21, the application presently has a total of 9 claims including 2 independent claims. It is respectfully submitted that no additional claim fees are required for the addition of new independent Claim 21.

CLAIM OBJECTIONS

Claims 1 and 10 are objected to for recitation of the phrase "biomedical substrate" which lacks antecedent basis. As noted above, Claim 1 has been cancelled. As the aforementioned term no longer appears in Claim 10, this objection no longer applies.

Claim 15 is objected to for a typographical error in the spelling of the term "disulfide." As noted above, Claim 15 has been cancelled. Thus, this objection is now moot.

Claims 4 and 13 are objected to under 37 CFR 1.75(c) as being of improper dependent form. As noted above, Claims 4 and 13 have been cancelled. Thus, this objection is now moot.

35 U.S.C. §102 REJECTION

Claims 1-9 stand rejected under 35 U.S.C. §102(b) for allegedly being anticipated by Barlett et al. (US Patent 6,503,382). As noted above, Claims 1-9 have been cancelled. Thus, this objection is now moot.

35 U.S.C. §103 REJECTION

Claims 10-20 stand rejected under 35 U.S.C. §103 for allegedly being obvious over Marinčić et al. (Marinčić and Soeldner, "Electrochemical Glucose Oxidation on a Platinized Platinum Electrode in Krebs-Ringer Solution," J. Electrochem. Soc.: Electrochemical Science and Technology, 126(1), 43-49 (1979); hereinafter referred to as "Marinčić") in view of Bartlett et al. (US Patent 6,503,382; hereinafter referred to as "Bartlett"), Evans et al. (Evans et al., "Detection of Hydrogen Peroxide at Mesoporous Platinum Microelectrodes," Anal. Chem. 74, 1322-1326 (2002); hereinafter referred to as "Evans") and Elliott et al. (Elliott et al., "Platinum Microelectrodes with Unique High Surface Areas," Langmuir, 15 (22), 7411-7415 (1999); hereinafter referred to as "Elliott"). As Claims 13, 15 and 16 have been cancelled, this rejection is moot with respect to those claims. Thus, the rejection of presently pending independent Claim 10 as well as dependent Claims 11, 12, 14, and 17-20 will be addressed below.

It is noted that Marinčić does not teach the use of a mesoporous platinum electrode for determining the concentration of glucose. Unlike the presently claimed invention which employs a mesoporous platinum electrode, Marinčić employs a conventional flat platinum electrode.

Bartlett teaches methods of depositing a porous film including a mesoporous platinum layer on electrodes. Bartlett further teaches that the deposited film may optionally be subjected to further treatment and among the extensive list provided therein includes adsorption of proteins such as

enzymes (see Bartlett, column 5, line 53 to column 6, line 3). Likewise, Bartlett further teaches that the porous films may have a variety of applications and among the extensive list provided therein includes biosensors for example for glucose (see Bartlett, column 9, lines 23-46). However, Bartlett does not exemplify methods of detecting glucose using a mesoporous platinum electrode.

Likewise, Elliott describes nanostructured platinum films electrodeposited onto microelectrodes and suggest that electrodes “may be of benefit to many branches of electrochemistry, such as electroanalysis, where, for example, the amperometric detection of organic species with poor electrode kinetics may be possible” (see Elliott, page 7415). However, Elliott does not exemplify methods of detecting glucose using a mesoporous platinum electrode.

Of the aforementioned references, only Evans actually exemplifies a mesoporous platinum electrode for use in detecting glucose. However, unlike the presently claimed invention which employs an electrode without any enzyme immobilized thereon, Evans employs a mesoporous platinum microdisk with glucose oxidase enzyme immobilized thereon (see Evans, page 1324, lines 26-28 and page 1326, lines 7-12). Nowhere does Evans disclose or suggest using mesoporous platinum electrode without any enzyme immobilized thereon. Thus, one of skill in the art would not be led to the presently claimed invention based on the combined teachings of Marinčić, Bartlett, Elliott and Evans.

Moreover, Applicants point out the teachings of Sun et al., Analytical Chemistry, 73(7):1599-1604 (2001), a copy of which is provided herein. Sun et al. teach that platinum electrode (Pt electrode) without any enzyme immobilized thereon showed an unsatisfactory response to glucose (see Sun et al., page 4, Figure 4A) compared to Pt-Pb alloy electrode (see Sun et al., page 4, Figure 4). In fact, Sun et al. even state that “these data confirm that pure Pt is not a

stable electrode material for the constant-potential detection of glucose” (see, Sun et al., page 1602, column 2 to page 1603, column 1, sentence bridging pages 1602-1603). Thus, based on Sun et al. (notably, a more recent publication than Marinčić), one of skill in the art would not be led to employ Pt without any enzyme immobilized thereon. Rather, Sun et al. would lead one of skill in the art to employ other electrodes made of Pt alloys rather than pure Pt as such alloys provide a superior response for the detection of glucose. Notably, Sun et al. neither disclose nor suggest using a mesoporous platinum electrode.

Despite the teachings of Evans and Sun et al., the present invention provides methods for detecting glucose using mesoporous Pt electrode without any enzyme immobilized thereon (see Fig 1 and 2 of the present invention). In fact, quantitative detection of glucose was achieved even in the presence of interfering materials such as ascorbic acid, acetaminophenol and chloride ion (see Example 2 of the present invention).

Claim 19 also stands rejected under 35 U.S.C. §103 for allegedly being obvious over Marinčić and Bartlett, and further in view of “Chemical Sensors and Biosensors” by Brian R. Eggins (hereinafter referred to as “Eggins”).

As noted above, Marinčić employs a conventional flat platinum electrode for determining the concentration of glucose. Nowhere does Marinčić disclose or suggest use of a mesoporous platinum electrode for determining the concentration of glucose.

Bartlett teaches methods of depositing a porous film including a mesoporous platinum layer on electrodes. Bartlett does not exemplify methods of detecting glucose using a mesoporous platinum electrode with or without any enzyme immobilized thereon.

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Eggins teaches that the silver-silver chloride electrode is similar to the saturated-calomel (mercurous chloride) electrode.

As discussed in detail above with regard to independent Claim 10 as well as dependent Claims 11, 12, 14, and 17-20, the combined teachings of the aforementioned references taken in light of the teachings of Evans and Sun et al. detailed above, would not lead one of skill in the art to the presently claimed invention which employs a mesoporous platinum electrode without any enzyme immobilized thereon.

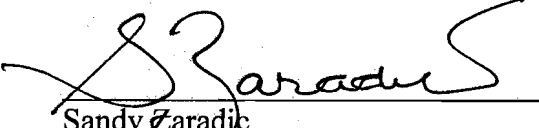
In light of the aforementioned amendments and remarks, Applicants respectfully request withdrawal of these rejections of Claims 10-20 under 35 U.S.C. §103.

CONCLUSION

In light of the aforementioned submission, Applicants believe Claims 10-12, 14 and 17-21 are in condition for allowance and respectfully request the same.

If there are any questions or if additional information is required, the Examiner is respectfully requested to contact Applicants' attorney at the number listed below.

Respectfully submitted,


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